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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/517,178	**Applicant(s)** ABE ET AL.	
	Examiner JASON E. MATTIS	**Art Unit** 2416	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 January 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16 and 21-28* is/are rejected.

7)☒ Claim(s) *17-20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the Amendment filed 1/26/09. Due to the claim amendments, the previous rejections under 35 U.S.C. 112 second paragraph have been withdrawn. Claims 1-28 are currently pending in the application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 5, 9, and 25-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. (U.S. Pat. 6993092 B1).

With respect to claim 1, Murakami et al. discloses a method of wireless transmitting data on a bust signal basis **(See the abstract and column 9 line 64 to column 10 line 3 of Murakami et al. for reference to transmitting a digital radio data in bursts)**. Murakami et al. also discloses inserting at least one data symbol of a second modulation method based on a communication control information into a data symbol stream of a first modulation method **(See column 10 lines 14-56 and Figure 16 of Murakami et al. for reference to frame configuration determination section 1601**

creating control information used to determine where to place a symbol using the configuration 201 having 16 QAM modulation, which is a second modulation method, as well as a symbol using the configuration 1701 having BPSK modulation, which is a first modulation method, within a single burst of data). Murakami et al. further discloses the data symbol of the second modulation method being inserted into the data symbol stream contiguous to a data symbol of the first modulation method **(See column 10 lines 14-56 and Figure 17 of Murakami et al. for reference to not generating pilot symbols when a level of symbol modulation is less than 8 meaning that no pilot symbols are inserted with the BPSK modulated symbols such that an inserted 16 QAM modulated symbols is immediately followed by and contiguous with a BPSK modulated symbol).** Murakami et al. further discloses the second modulation method having more modulation levels than the first modulation method **(See column 10 lines 37-56 and Figures 3 and 18 of Murakami et al. for reference to 16 QAM modulation having more modulation levels than BPSK modulation).** Murakami et al. also discloses transmitting the transmission burst including the data symbol of the first modulation method and the data symbol of the second modulation method **(See column 10 lines 52-56 of Murakami et al. for reference to transmitting a burst including symbols of 16 QAM modulation and symbols of BPSK modulation).** Although Murakami et al. discloses selecting a modulation format for each symbol based on changing transmission path requirements **(See column 1 lines 51-62 and column 3 lines 43-58 of Murakami et al.)**, Murakami et al. does not specifically disclose a number of data symbols of the first modulation

method in a transmitted burst being more than a number of data symbols of the second modulation method. However, since Murakami et al. discloses that the exact ratio of 16 QAM modulated symbols to BPSK modulated symbols depends on the changing transmission path requirements, it would have been obvious to include more BPSK modulated symbols than 16QAM modulated symbols in a burst between pilot signals during a time in which the transmission path has a low quality, because BPSK modulated symbols have better resistance to fading and error resiliency than 16 QAM modulated symbols **(See column 10 lines 44-51 of Murakami et al.)**. Thus, it would have been obvious for one of ordinary skill in the art at the time of the invention to use a number of data symbols of the first modulation method in a transmitted burst being more than a number of data symbols of the second modulation method with the motivation being to transmit a wireless burst having greater resistance to fading and greater error resiliency.

With respect to claim 5, Murakami et al. discloses communication control information representing when communication quality is different at each symbol position in a burst, a place where the data symbol of the second modulation method is inserted is assigned to a symbol position of which communication quality is considered in advance better than a position of the data symbol of the first modulation method **(See column 1 lines 51-62, column 3 lines 43-58, and column 10 lines 44-51 of Murakami et al. for reference to determining where to place symbols of different modulation based on transmission path quality and for reference to using 16 QAM in place of BPSK when transmission quality is better)**.

With respect to claim 9, Murakami et al. discloses a wireless data communication system **(See the abstract and column 9 line 64 to column 10 line 3 of Murakami et al. for reference to a radio communication system)**. Murakami et al. also discloses a wireless data reception device **(See column 10 line 65 to column 11 line 3 and Figure 20 of Murakami et al. for reference to a reception apparatus)**. Murakami et al. further discloses a reception quality measuring means for measuring reception quality at each data symbol position in a burst received, a reception quality notifying means for notifying a transmission device of information about reception quality measured by the reception quality measurement means, and a communication quality information obtaining means for obtaining the information about the reception quality notified by the reception device **(See column 10 lines 14-36, column 11 lines 9-16, and Figures 16 and 20 of Murakami et al. for reference to transmission path distortion estimation section 2001 measuring an amount of transmission path distortion and reporting the measurement to the frame configuration determination section 1601 of a transmitter)**. Murakami et al. also discloses an insertion place detecting means for assigning, based on the reception quality information, an insertion place for at least one data symbol of a second modulation method into a data symbol stream of a first modulation method to a data symbol position of which communication quality is better than another data symbol position **(See column 1 lines 51-62, column 3 lines 43-58, and column 10 lines 44-51 of Murakami et al. for reference to determining where to place symbols of different modulation based on transmission path quality and for reference to using 16**

QAM, which is a second modulation method, in place of BPSK, which is a first modulation method, when transmission quality is better). Murakami et al. further discloses the data symbol of the second modulation method being inserted into the data symbol stream contiguous to a data symbol of the first modulation method **(See column 10 lines 14-56 and Figure 17 of Murakami et al. for reference to not generating pilot symbols when a level of symbol modulation is less than 8 meaning that no pilot symbols are inserted with the BPSK modulated symbols such that an inserted 16 QAM modulated symbols is immediately followed by and contiguous with a BPSK modulated symbol).** Murakami et al. further discloses the second modulation method having more modulation levels that the first modulation method **(See column 10 lines 37-56 and Figures 3 and 18 of Murakami et al. for reference to 16 QAM modulation having more modulation levels than BPSK modulation)**. Although Murakami et al. discloses selecting a modulation format for each symbol based on changing transmission path requirements **(See column 1 lines 51-62 and column 3 lines 43-58 of Murakami et al.)**, Murakami et al. does not specifically disclose a number of data symbols of the first modulation method in a transmitted burst being more than a number of data symbols of the second modulation method. However, since Murakami et al. discloses that the exact ratio of 16 QAM modulated symbols to BPSK modulated symbols depends on the changing transmission path requirements, it would have been obvious to include more BPSK modulated symbols than 16QAM modulated symbols in a burst between pilot signals during a time in which the transmission path has a low quality, because BPSK modulated symbols have better

resistance to fading and error resiliency than 16 QAM modulated symbols **(See column 10 lines 44-51 of Murakami et al.)**. Thus, it would have been obvious for one of ordinary skill in the art at the time of the invention to use a number of data symbols of the first modulation method in a transmitted burst being more than a number of data symbols of the second modulation method with the motivation being to transmit a wireless burst having greater resistance to fading and greater error resiliency.

With respect to claim 25, Murakami et al. discloses a method of wireless transmitting for data communication **(See the abstract and column 9 line 64 to column 10 line 3 of Murakami et al. for reference to a digital radio communication method)**. Murakami et al. also discloses a transmitting burst configuring step for inserting at least one pilot symbol and at least one data symbol of a second modulation method into a data symbol stream of a first modulation method and configuring a transmitting burst **(See column 10 lines 14-56 and Figures 3 and 18 of Murakami et al. for reference to frame configuration determination section 1601 selecting different symbols including a symbol using the configuration 201 having 16 QAM modulation, which is a first modulation method, as well as a symbol using the configuration 1701 having BPSK modulation, which is a second modulation method, within a single burst of data including a pilot signal transmitted with the symbol using the configuration 201)**. Murakami et al. further discloses the data symbol of the second modulation method being inserted into the data symbol stream contiguous to a data symbol of the first modulation method **(See column 10 lines 14-56 and Figure 17 of Murakami et al. for reference to not generating pilot symbols**

when a level of symbol modulation is less than 8 meaning that no pilot symbols are inserted with the BPSK modulated symbols such that an inserted 16 QAM modulated symbols is immediately followed by and contiguous with a BPSK modulated symbol). Murakami et al. further discloses transmitting the transmission burst including the data symbol of the first modulation method and the data symbol of the second modulation method **(See column 10 lines 52-56 of Murakami et al. for reference to transmitting a burst including symbols of 16 QAM modulation and symbols of BPSK modulation)**. Although Murakami et al. discloses selecting a modulation format for each symbol based on changing transmission path requirements **(See column 1 lines 51-62 and column 3 lines 43-58 of Murakami et al.)**, Murakami et al. does not specifically disclose a number of data symbols of the second modulation method in a transmitted burst being more than a value obtained by multiplying a data amount transmitted by the first modulation method and the number of the pilot symbols. However, since Murakami et al. discloses that the exact ratio of 16 QAM modulated symbols to BPSK modulated symbols depends on the changing transmission path requirements, it would have been obvious to include more BPSK modulated symbols than 16QAM modulated symbols in a burst between pilot signals during a time in which the transmission path has a low quality, because BPSK modulated symbols have better resistance to fading and error resiliency than 16 QAM modulated symbols **(See column 10 lines 44-51 of Murakami et al.)**. Thus, it would have been obvious for one of ordinary skill in the art at the time of the invention to use a number of data symbols of the second modulation method in a transmitted burst being more than a value obtained

by multiplying a data amount transmitted by the first modulation method and the number of the pilot symbols with the motivation being to transmit a wireless burst having greater resistance to fading and greater error resiliency.

With respect to claim 26, Murakami et al. discloses the pilot symbol being inserted into the symbol stream of the first modulation method constantly wherein at least one data symbol of the second modulation method is inserted between the pilot symbols **(See column 10 lines 14-56 of Murakami et al. for reference to based on transmission path quality, inserting a 16 QAM modulated symbol followed by a BPSK modulated symbol when transmission path quality decreases, with each 16 QAM modulated symbol including a pilot signal)**.

With respect to claim 27, Murakami et al. discloses a wireless data transmission device that carries out data communication **(See column 9 line 64 to column 10 line 9 and Figure 16 of Murakami et al. for reference to a transmission apparatus transmitting radio data)**. Murakami et al. also discloses a data stream dividing means dividing the transmission data at a given ratio **(See column 10 lines 14-36 for reference to frame configuration determination section 1601 dividing a data stream into sections to be transmitted using different modulation methods based on transmission path quality information)**. Murakami et al. further discloses a first quadrature vector mapping means for providing a first divided data with a signal space diagram according to a first modulation method and outputting a data symbol stream of the first modulation method **(See column 10 lines 14-56 and Figure 3 of Murakami et al. for reference to the frame configuration determination section 1601 including a**

first mapping means to map data into 16 QAM symbols with a signal space diagram as shown in Figure 3). Murakami et al. also discloses a second quadrature vector mapping means for providing a second divided data with a signal space diagram according to a second modulation method and outputting a data symbol stream of the second modulation method **(See column 10 lines 14-56 and Figure 18 of Murakami et al. for reference to the frame configuration determination section 1601 including a second mapping means to map data into BPSK symbols with a signal space diagram as shown in Figure 18)**. Murakami et al. further discloses a multiplexing means inserting the data symbol of the second modulation method and a pilot symbol into the data stream of the first modulation method and generating a transmission burst **(See column 10 lines 14-56 of Murakami et al. for reference to the frame configuration section 104 multiplexing 16 QAM, BPSK, and pilot symbols to generate a transmission burst based on control signals output from the frame configuration determination section 1601)**. Murakami et al. further discloses the data symbol of the second modulation method being inserted into the data symbol stream contiguous to a data symbol of the first modulation method **(See column 10 lines 14-56 and Figure 17 of Murakami et al. for reference to not generating pilot symbols when a level of symbol modulation is less than 8 meaning that no pilot symbols are inserted with the BPSK modulated symbols such that an inserted 16 QAM modulated symbols is immediately followed by and contiguous with a BPSK modulated symbol)**. Murakami et al. also discloses a transmitter means for transmitting the transmission burst **(See column 10 lines 52-56 of Murakami et al.**

for reference to transmission radio section 107 transmitting the burst). Although Murakami et al. discloses selecting a modulation format for each symbol based on changing transmission path requirements **(See column 1 lines 51-62 and column 3 lines 43-58 of Murakami et al.)**, Murakami et al. does not specifically disclose a number of data symbols of the second modulation method in a transmitted burst being more than a value obtained by multiplying a data amount transmitted by the first modulation method and the number of the pilot symbols. However, since Murakami et al. discloses that the exact ratio of 16 QAM modulated symbols to BPSK modulated symbols depends on the changing transmission path requirements, it would have been obvious to include more BPSK modulated symbols than 16QAM modulated symbols in a burst between pilot signals during a time in which the transmission path has a low quality, because BPSK modulated symbols have better resistance to fading and error resiliency than 16 QAM modulated symbols **(See column 10 lines 44-51 of Murakami et al.)**. Thus, it would have been obvious for one of ordinary skill in the art at the time of the invention to use a number of data symbols of the second modulation method in a transmitted burst being more than a value obtained by multiplying a data amount transmitted by the first modulation method and the number of the pilot symbols with the motivation being to transmit a wireless burst having greater resistance to fading and greater error resiliency.

With respect to claim 28, Murakami et al. discloses the pilot symbol being inserted into the symbol stream of the first modulation method constantly wherein at least one data symbol of the second modulation method is inserted between the pilot

symbols **(See column 10 lines 14-56 of Murakami et al. for reference to based on transmission path quality, inserting a 16 QAM modulated symbol followed by a BPSK modulated symbol when transmission path quality decreases, with each 16 QAM modulated symbol including a pilot signal)**.

4. Claims 2-4, 6-8, and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. in view of Krishnamoorthy et al. (U.S. Pat. 6490270 B1).

With respect to claim 2, Murakami et al. discloses a method of wireless receiving data on a burst signal basis **(See the abstract and column 9 line 64 to column 10 line 3 of Murakami et al. for reference to transmitting and receiving a digital radio data in bursts)**. Murakami et al. also discloses receiving a burst signal including communication control information and a data symbol stream comprising a data symbol of a second modulation method inserted into a data symbol stream of a first modulation method **(See column 10 line 14 to column 11 line 8 and Figure 20 of Murakami et al. for reference to a reception apparatus receiving a burst signal including a pilot symbol, which includes control information, and a 16 QAM modulated symbol, which is a data symbol of a second modulation method, inserted into a data symbol stream of BPSK modulated symbols, which is a data stream of a first modulation method)**. Murakami et al. further discloses the data symbol of the second modulation method being inserted into the data symbol stream contiguous to a data symbol of the first modulation method **(See column 10 lines 14-56**

and Figure 17 of Murakami et al. for reference to not generating pilot symbols when a level of symbol modulation is less than 8 meaning that no pilot symbols are inserted with the BPSK modulated symbols such that an inserted 16 QAM modulated symbols is immediately followed by and contiguous with a BPSK modulated symbol). Murakami et al. further discloses the second modulation method having more modulation levels than the first modulation method **(See column 10 lines 37-56 and Figures 3 and 18 of Murakami et al. for reference to 16 QAM modulation having more modulation levels than BPSK modulation).** Murakami et al. also discloses detecting a data symbol on a symbol basis **(See column 10 line 65 to column 11 line 31 of Murakami et al. for reference to detecting the components of each symbol on a symbol basis).** Although Murakami et al. discloses selecting a modulation format for each symbol based on changing transmission path requirements **(See column 1 lines 51-62 and column 3 lines 43-58 of Murakami et al.)**, Murakami et al. does not specifically disclose a number of data symbols of the first modulation method in a transmitted burst being more than a number of data symbols of the second modulation method. However, since Murakami et al. discloses that the exact ratio of 16 QAM modulated symbols to BPSK modulated symbols depends on the changing transmission path requirements, it would have been obvious to include more BPSK modulated symbols than 16QAM modulated symbols in a burst between pilot signals during a time in which the transmission path has a low quality, because BPSK modulated symbols have better resistance to fading and error resiliency than 16 QAM modulated symbols **(See column 10 lines 44-51 of Murakami et al.)**. Thus, it would

have been obvious for one of ordinary skill in the art at the time of the invention to use a number of data symbols of the first modulation method in a transmitted burst being more than a number of data symbols of the second modulation method with the motivation being to transmit a wireless burst having greater resistance to fading and greater error resiliency. Murakami et al. does not specifically disclose the communication control information being known to a transmitter and showing the first modulation method and the second modulation method used in the transmission burst.

With respect to claim 3, Murakami et al. discloses a wireless transmission device of a communication system that carries out data communication on a burst basis by digital modulation **(See the abstract, column 9 line 64 to column 10 line 9, and Figure 1 of Murakami et al. for reference to a transmission apparatus of a digital radio communication system communicating data on a burst basis by digital modulation)**. Murakami et al. also discloses a data stream dividing means dividing transmission data at a given ratio **(See column 10 lines 14-36 and Figure 16 of Murakami et al. for reference to frame configuration and determination section 1601 dividing a data stream into symbols of different modulation types at a ratio as determined by current transmission path information)**. Murakami et al. further disclose a first quadrature vector mapping means providing a first divided data with a signal space diagram according to a first modulation method **(See column 10 lines 14-56 and Figures 16 and 18 of Murakami et al. for reference to frame configuration section 104 having a means to map a first part of a data stream with a signal space diagram according to a BPSK modulation method, which is a first**

modulation method, as shown in Figure 18). Murakami et al. also discloses a second quadrature vector mapping means providing a second divided data with a signal space diagram according to a second modulation method **(See column 10 lines 14-56 and Figures 3 and 16 of Murakami et al. for reference to frame configuration section 104 having a means to map a second part of a data stream with a signal space diagram according to a 16 QAM modulation method, which is a second modulation method, as shown in Figure 3)**. Murakami et al. further discloses the second modulation method having a higher modulation level than the first modulation method **(See column 10 lines 37-56 and Figures 3 and 18 of Murakami et al. for reference to 16 QAM modulation having more modulation levels than BPSK modulation)**. Murakami et al. also discloses a multiplexing means placing a symbol modulated by the first modulation method and a symbol modulated by the second modulation method at given places respectively then multiplexing a transmission burst **(See column 10 lines 14-36 and Figure 16 of Murakami et al. for reference to the frame configuration section 104 multiplexing together BPSK modulated symbols and 16 QAM modulated symbols into a transmission burst based on information received from the frame configuration determination section 1601)**. Murakami et al. further discloses the data symbol of the second modulation method being multiplexed a position contiguous to a data symbol of the first modulation method **(See column 10 lines 14-56 and Figure 17 of Murakami et al. for reference to not generating pilot symbols when a level of symbol modulation is less than 8 meaning that no pilot symbols are inserted with the BPSK modulated symbols**

such that an inserted 16 QAM modulated symbols is immediately followed by and contiguous with a BPSK modulated symbol). Although Murakami et al. discloses selecting a modulation format for each symbol based on changing transmission path requirements **(See column 1 lines 51-62 and column 3 lines 43-58 of Murakami et al.)**, Murakami et al. does not specifically disclose a number of data symbols of the first modulation method in a transmitted burst being more than a number of data symbols of the second modulation method. However, since Murakami et al. discloses that the exact ratio of 16 QAM modulated symbols to BPSK modulated symbols depends on the changing transmission path requirements, it would have been obvious to include more BPSK modulated symbols than 16QAM modulated symbols in a burst between pilot signals during a time in which the transmission path has a low quality, because BPSK modulated symbols have better resistance to fading and error resiliency than 16 QAM modulated symbols **(See column 10 lines 44-51 of Murakami et al.)**. Thus, it would have been obvious for one of ordinary skill in the art at the time of the invention to use a number of data symbols of the first modulation method in a transmitted burst being more than a number of data symbols of the second modulation method with the motivation being to transmit a wireless burst having greater resistance to fading and greater error resiliency. Murakami et al. does not specifically disclose the communication control information being known to a receiver and determining a modulation method on respective data symbols.

With respect to claim 4, Murakami et al. discloses a wireless data reception device of a communication system that carries out communication on a burst basis by

digital modulation **(See the abstract, column 9 line 64 to column 10 line 3, column 10 line 65 to column 11 line 3, and Figure 20 of Murakami et al. for reference to a reception apparatus of a digital radio communication system that carries out communication on a burst basis by digital modulation)**. Murakami et al. also disclose a reception process means receiving a communication signal then outputting a burst signal of the received signal **(See column 10 line 65 to column 11 line 21 and Figure 20 for reference to the detection section 2002 receiving a signal and then outputting a digital reception signal, which is a burst signal of the received signal)**. Murakami et al. further discloses the communication signal comprising at least one data symbol of a second modulation method being inserted into a data symbol stream contiguous to a data symbol of a first modulation method **(See column 10 lines 14-56 and Figure 17 of Murakami et al. for reference to not generating pilot symbols when a level of symbol modulation is less than 8 meaning that no pilot symbols are inserted with the BPSK modulated symbols such that an inserted 16 QAM modulated symbols is immediately followed by and contiguous with a BPSK modulated symbol in a data stream)**. Murakami et al. further discloses a dividing means dividing the burst signal at a given ratio **(See column 10 line 14 to column 11 line 21 and Figure 20 of Murakami et al. for reference to a received signal being divided into different section using different modulation methods at a given ratio)**. Murakami et al. also discloses a first symbol detecting means for providing a first divided signal with symbol detection in response to a first modulation method **(See column 10 line 14 to column 11 line 21 and Figure 20 of Murakami et al. for**

reference to detecting first symbols that have been encoded using BPSK modulation, which is a first modulation method). Murakami et al. further discloses a second symbol detecting means providing a second divided signal with symbol detection in response to a second modulation method **(See column 10 line 14 to column 11 line 21 and Figure 20 of Murakami et al. for reference to detecting second symbols that have been encoded using 16 QAM modulation, which is a second modulation method)**. Murakami et al. also discloses the second modulation method having a higher modulation level than the first modulation method **(See column 10 lines 37-56 and Figures 3 and 18 of Murakami et al. for reference to 16 QAM modulation having more modulation levels than BPSK modulation)**. Murakami et al. further discloses a data stream multiplexing means for placing a result detected by the first and second symbol detection means in a given order and multiplexing a reception data stream **(See column 10 line 14 to column 11 line 21 and Figure 20 of Murakami et al. for reference to the reception apparatus receiving a burst including both BPSK and 16 QAM symbols, demodulating the received symbols, and multiplexing the received symbols in order to create an output digital reception signal)**. Although Murakami et al. discloses selecting a modulation format for each symbol based on changing transmission path requirements **(See column 1 lines 51-62 and column 3 lines 43-58 of Murakami et al.)**, Murakami et al. does not specifically disclose a number of data symbols of the first modulation method in a transmitted burst being more than a number of data symbols of the second modulation method. However, since Murakami et al. discloses that the exact ratio of 16 QAM

modulated symbols to BPSK modulated symbols depends on the changing transmission path requirements, it would have been obvious to include more BPSK modulated symbols than 16QAM modulated symbols in a burst between pilot signals during a time in which the transmission path has a low quality, because BPSK modulated symbols have better resistance to fading and error resiliency than 16 QAM modulated symbols **(See column 10 lines 44-51 of Murakami et al.)**. Thus, it would have been obvious for one of ordinary skill in the art at the time of the invention to use a number of data symbols of the first modulation method in a transmitted burst being more than a number of data symbols of the second modulation method with the motivation being to transmit a wireless burst having greater resistance to fading and greater error resiliency. Murakami et al. does not specifically disclose the communication control information being known to a transmitter and determining a modulation method on respective data symbols.

With respect to claim 12, Murakami et al. does not disclose inserting known bit data in a part of the data symbol of the second modulation method so that a signal space diagram at a modulation time is limited.

With respect to claims 2-4 and 12, Krishnamoorthy et al., in the field of communications, discloses transmitting and receiving communication control information known to a transmitter and receiver and defining whether a first modulation method or a second modulation method has been used to transmit symbols **(See column 4 lines 45-56 of Krishnamoorthy et al. for reference to incorporating specific training sequences into the preamble of each time slot to identify the**

type of modulation used for the symbols of the time slot). Transmitting and receiving communication control information known to a transmitter and receiver and defining whether a first modulation method or a second modulation method has been used to transmit symbols has the advantage of explicitly identifying a modulated method used to transmit a symbol in a burst thus reducing the amount of processing needed by a receiver to determine a modulation type of the symbol.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Krishnamoorthy et al., to combine transmitting and receiving communication control information known to a transmitter and receiver and defining whether a first modulation method or a second modulation method has been used to transmit symbols, as suggested by Krishnamoorthy et al., with the system and method of Murakami et al., with the motivation being to reduce the amount of processing needed by a receiver to determine a modulation type of a symbol.

With respect to claim 6-8, Murakami et al. discloses measuring, determining, and notifying communication control information representing whether communication quality is different at each symbol position in a burst, and deciding a place where the data symbol of the second modulation method is inserted is assigned to a symbol position of which communication quality is considered in advance better than a position of the data symbol of the first modulation method **(See column 1 lines 51-62, column 3 lines 43-58, and column 10 lines 44-51 of Murakami et al. for reference to determining where to place symbols of different modulation based on**

transmission path quality and for reference to using 16 QAM in place of BPSK when transmission quality is better).

With respect to claims 13-16, Murakami et al. discloses estimating reception quality of a signal received using a vector of the signal inserted on a symbol basis received at a symbol position of a higher modulation level placed away by a given Euclidean distance in response to an amplitude of a symbol of a lower modulation method **(See column 5 lines 13-41, column 10 lines 37-64, and Figures 3, 4, 18, and 19 of Murakami et al. for reference to estimating reception quality using a signal point layout of a known pilot symbol vector inserted on a symbol basis where a symbol of higher modulation is placed away from a symbol of lower modulation by to a given distance according to a signal point layout).**

5. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. in view of Krishnamoorthy et al. and in further view of Moon et al. (U.S. Publication US 2003/0021240 A1).

With respect to claims 10 and 11, the combination of Murakami et al. and Krishnamoorthy et al. does not specifically disclose superimposing partial redundant data to be retransmitted to a position of a symbol having a higher modulation level and correcting an error by outputting a redundant section deleted at the coding through another channel, storing the deleted section and supplying the redundant section stored for superimposing the retransmitted partial data.

With respect to claims 10 and 11, Moon et al., in the field of communications, discloses superimposing partial redundant data to be retransmitted to a position of a symbol having a higher modulation level and correcting an error by outputting a redundant section deleted at the coding through another channel, storing the deleted section and supplying the redundant section stored for superimposing the retransmitted partial data **(See page 3 paragraph 21 to page 4 paragraph 27 and Figure 5 of Moon et al. for reference to transmitting partial redundant data at a higher modulation rate and combining received partial redundant data with stored deleted data of the originally transmitted data)**. Superimposing partial redundant data to be retransmitted to a position of a symbol having a higher modulation level and correcting an error by outputting a redundant section deleted at the coding through another channel, storing the deleted section and supplying the redundant section stored for superimposing the retransmitted partial data has the advantage of allowing data errors to be efficiently corrected through data retransmission.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Moon et al., to combine superimposing partial redundant data to be retransmitted to a position of a symbol having a higher modulation level and correcting an error by outputting a redundant section deleted at the coding through another channel, storing the deleted section and supplying the redundant section stored for superimposing the retransmitted partial data, as suggested by Moon et al, with the system and method of Murakami et al. and Krishnamoorthy et

al., with the motivation being to allow data errors to be efficiently corrected through data retransmission.

6. Claims 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. in view of Krishnamoorthy et al. and in further view of Shahar et al. (U.S. Publication US 2003/0002495 A1).

With respect to claims 21 and 23, the combination of Murakami et al. and Krishnamoorthy et al. does not specifically disclose generating a transmission packet which outputs information about a size of the packet and detecting a quantity and insertion place of a symbol having a higher modulation level based on the information about a size of the transmission packet for controlling data separation.

With respect to claims 22 and 24, the combination of Murakami et al. and Krishnamoorthy et al. does not specifically disclose that the information about the packet size is inserted in the transmission burst.

With respect to claims 21-24, Shahar et al., in the field of communications, discloses generating a transmission packet which outputs information about a size of the packet and detecting a quantity and insertion place of a symbol having a higher modulation level based on the information about a size of the transmission packet for controlling data separation **(See page 1 paragraphs 13-14, page 7 paragraphs 62-63, and Figures 3 and 4 of Shahar et al. for reference to a data stream being divided into data packets 220 containing a header 240 including information about a modulation type 300 and a length 310 of a data field 250 and for reference to a**

receiver using the information about the modulation type and the length to reconstruct a packet by determining a quantity and insertion place of data having a higher modulation level). Generating a transmission packet which outputs information about a size of the packet and detecting a quantity and insertion place of a symbol having a higher modulation level based on the information about a size of the transmission packet for controlling data separation has the advantage of allowing more customization of transmitted data for more efficient transmission of data by allowing for different packet data lengths.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Shahar et al., to combine generating a transmission packet which outputs information about a size of the packet and detecting a quantity and insertion place of a symbol having a higher modulation level based on the information about a size of the transmission packet for controlling data separation, as suggested by Shahar et al, with the system and method of Murakami et al. and Krishnamoorthy et al., with the motivation being to allow more customization of transmitted data for more efficient transmission of data by allowing for different packet data lengths.

Allowable Subject Matter

7. Claims 17-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: Claims 17 and 19 would be allowable since none of the prior art of record discloses or renders obvious detecting a quantity and insertion place of the data symbol having the higher modulation level based on information about the size of a transmission packet and information about a size of a burst in a physical layer, as claimed. Claims 18 and 20 would be allowable since they depend on claims 17 and 19 respectively.

Response to Arguments

9. Applicant's arguments filed 1/26/09 have been fully considered but they are not persuasive.

Regarding Applicant's argument that Murakami et al. does not disclose the newly added limitation stating "the at least one data symbol of the second modulation method being inserted into the data symbol stream contiguous to a data symbol of the first modulation method", the Examiner respectfully disagrees. Applicant argues that each

of the data symbols of different modulation types shown in Figure 2 of Murakami et al. are separated by pilot symbols and thus are not contiguous when inserted into a data symbol stream. While this is true, the argument is moot, since the rejections above are based on a different embodiment of Murakami et al. than the one discussed in the Applicant's arguments. Murakami et al. discloses an embodiment 4 that uses BPSK modulated symbols and QPSK modulated symbols in addition to the 16 QAM symbols and 8 PSK symbols shown in Figure 2 (See column 10 lines 14-56 and Figures 16 and 17 of Murakami et al.). The BPSK and QPSK symbols are generated without using any pilot symbols, as shown in Figure 17. Thus a 16 QAM modulated symbol of Figure 2 is inserted into a stream of BPSK modulated symbols of Figure 17 without being separated by a pilot symbol such that the 16 QAM modulated symbol is immediately followed by and contiguous with a BPSK modulated symbol. Therefore, Murakami et al. does disclose an embodiment where "the at least one data symbol of the second modulation method being inserted into the data symbol stream contiguous to a data symbol of the first modulation method", as claimed.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON E. MATTIS whose telephone number is (571)272-3154. The examiner can normally be reached on M-F 8AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571)272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jason E Mattis
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JEM

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